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Report on the ESO Workshop

La Silla Paranal Users Workshop

held at ESO Headquarters, Garching, Germany, 12–14 March 2018

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In March, ESO organised the La Silla Paranal Users Workshop, providing current and future users of its observatories with an overview of the available instruments, as well as the most commonly used tools and processes at ESO, from proposal submission to data reduction and data archive. One full day of the event was dedicated to hands-on data reduction tutorials and one-to-one sessions between participants and ESO staff to work jointly on the issues brought up by the participants. The workshop attracted about 50 on-site participants as well as a dozen remote attendees, mostly from Australia.

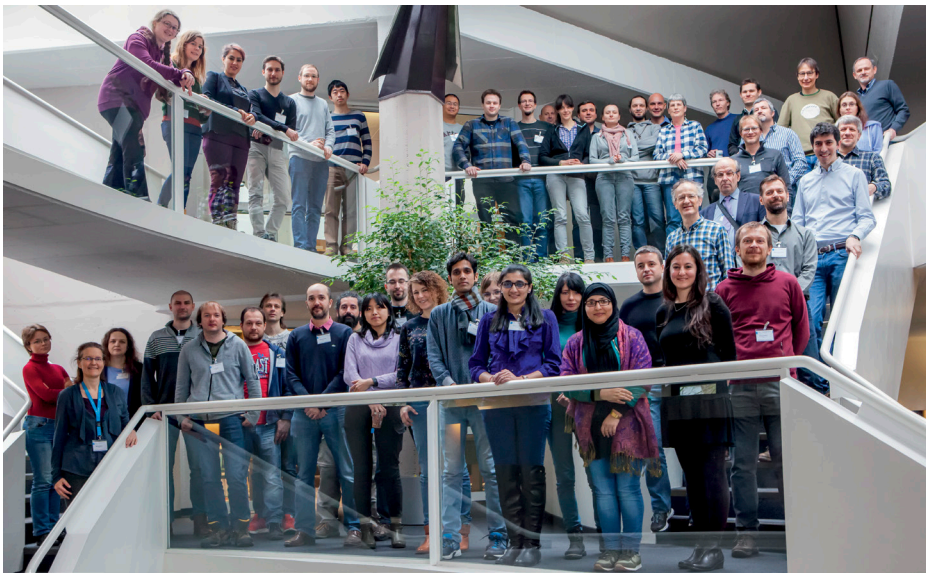

Figure 1. The workshop participants outside the ESO library.

ESO's ground-based observatories in Chile serve a very diverse astronomical community. The La Silla Paranal observatory offers astronomers the possibility of observing with a variety of telescopes, instruments and observing modes, including both Visitor Mode and Service Mode observations. Furthermore, the Observatory provides support to its users, monitors the quality of all observations and the status of its instruments, archives data, and for many instruments, delivers science grade pipelines and reduced data products. This level of support relies on complex machinery that, although efficient, may be daunting for members of ESO's user community. ESO therefore decided to host a three-day workshop, in order to present the various tools and services available and, at the same time, provide help with improving the technical aspects of their proposals, and with reducing data obtained with instruments at La Silla and Paranal.

Opening the workshop with a welcome address, Michael Sterzik, head of the Data Management and Operations division at ESO, reminded the audience that the La Silla Paranal Observatory uses a sophisticated and successful operational model, at the centre of which is the user community. This community is continuously growing, as there are about 100 new Principal Investigators (PIs) per semester submitting proposals to use ESO telescopes. As a result, there is a continued need for support and help for new users, especially those who are still in the early stages of their careers; this was one of the main aims of this workshop.

Moreover, ESO has recently signed a partnership with Australia and many Australian colleagues were very keen to learn about ESO. The original idea behind the workshop was to enable face-to-face interaction between users and ESO staff. However, given the strong interest from the new Australian community and considering the cost and time to travel to Garching from Australia, remote participation via Zoom was set up by our Australian colleagues to enable them to follow the various presentations and demonstrations in real-time. A few other colleagues, mostly from South America, also took advantage of this possibility. In total there were about 50 on-site participants, with a good gender balance (45% female), and strong participation from another recent ESO member state, Poland. Among the presenters, chairs and tutors, all from ESO (20 in total), the gender balance was not quite as good (33% female), but still representative of ESO staff.

The Very Large Telescope (VLT) Programme Scientist, Bruno Leibundgut, presented an overview of ESO and its observatories, stressing the great flexibility, scientific productivity and versatility of the La Silla Paranal Observatory. The Observatory instrumentation provides fields of view up to 1 degree, and a range of spatial resolutions with the smallest one less than 2 milliarcseconds, and a wide spectral coverage (from visible to infrared), which allows astronomers to probe the Universe in complementary ways. Bruno focused on some examples, such as the unique ESO exoplanet "machinery", comprising an unequalled suite of instruments: the High Accuracy Radial velocity Planet Searcher (HARPS); the Nasmyth Adaptive Optics System Near-Infrared Imager and Spectrograph (NACO); the Spectro-Polarimetric High-contrast Exoplanet REsearch instrument (SPHERE); the VLT Interferometer (VLTI); the FOcal Reducer/low dispersion Spectrograph 2 (FORS2); and, soon, the CRyogenic high-resolution InfraRed Echelle Spectrograph (CRIRES+). He also emphasised the possibility of performing long-term observations, for example, of SN 1987A which has been observed over three decades at ESO observatories. Finally, he also outlined the various programmes, workshop series, and publications — such as the ESO Messenger — that allow ESO to maintain a link with its community.

Henri Boffin presented the impressive suite of instruments available at La Silla

and Paranal and the science that they enable. Astronomers who wish to observe in the visible or infrared wavelength range are sure to find something that will suit their scientific goals. This will continue to improve, as ESO aims for the La Silla Paranal Observatory to maintain its world-leading position for at least another 10–15 years by means of continued instrument upgrades, as well as the addition of powerful new instruments (as Bruno Leibundgut had previously explained). This concerns not only the VLT but also the VLTI, the 3.5-metre New Technology Telescope (NTT), the ESO 3.6-metre telescope, and the 4-metre Visible and Infrared Survey Telescope for Astronomy (VISTA).

Among the impressive advances that will enhance the Observatory's capabilities in the coming years, new observing modes and future instruments were highlighted: the Echelle SPectrograph for Rocky Exoplanet and Stable Spectroscopic Observations (ESPRESSO); GRAVITY's astrometric mode; the Multi-AperTure mid-Infrared SpectroScopic Experiment (MATISSE); the Multi Unit Spectroscopic Explorer (MUSE) AO Narrow Field Mode; CRIRES+; the Enhanced Resolution Imager and Spectrograph (ERIS); the Multi-Object Optical and Near-infrared Spectrograph for the VLT (MOONS); the Son Of X-Shooter (SOXS); and the Near Infra-Red Planet Searcher (NIRPS).

Most of these instruments can be used in Service (or queue) mode (SM) or in Visitor (classical) mode (VM). Francesca Primas and Michael Hilker highlighted the differences between these two observing modes, setting out their pros and cons. For example, VM allows real-time decisions and is best suited to challenging observations by experts. SM is most appropriate for demanding observing conditions — for example, transparency and seeing — as the observations are performed when the weather conditions fulfil the user's requirements. SM is also best suited to special observing strategies such as monitoring a particular target or field.

There is a clear educational aspect to observing in VM and, as Francesca pointed out, everyone should go at least once to the telescope to get acquainted with observing, and to become familiar with the sites and the people running operations. This helps to facilitate later interactions when observing in SM. SM observations provide a different educational opportunity, as they require the ability to structure one's observing strategy and clearly communicate it to the Observatory's staff who will be performing the observations following these instructions. The advantages of SM seem clear to the community. Michael showed that currently the fraction of VM requests is only around 15%, and more and more PIs are requesting SM.

The choice of observing mode, SM or VM, is made at the time of proposal preparation. Dimitri Gadotti and Nando Patat gave a talk about writing a successful proposal. They strongly suggested that everyone read the Call for Proposal (CfP) regularly, as this is the contract between ESO and the PIs. There is no miracle recipe for making a proposal successful, but Dimitri gave some guidelines and advice to follow when preparing and submitting a proposal — much of it based on common sense.

For those who are successful in getting their proposals approved and scheduled, Monika Petr-Gotzens explained how to make the most of the allocated observing time, i.e., how to define the right strategy and carefully plan the observations. A SM user should submit their observing material by the Phase 2 deadline, and check well in advance if any of the SM rules cannot be followed — in which case they would need to request a waiver. Too often users realise a waiver is needed the day before the Phase 2 deadline and start to panic. In SM, it is also crucial to monitor the progress of the scheduled observations and check the data immediately after they are acquired, so as to be able to react quickly in case there is any need for correction. In addition, Christian Hummel encouraged the audience to use the interferometric mode of the VLT as it is easier than most think.

John Pritchard presented an overview of the wealth of information available on the ESO website, including the possibility of seeing that the lasers are being used at Paranal while riding the Munich subway on the way to the workshop. The Science web pages contain invaluable material for preparing one's observations. There is even the possibility that people may be overwhelmed by the quantity of information available. Hence, the need for a clearer structure; the principal gateway for science users is the User Portal. However, it is still necessary to review the information contained in the ESO Science web pages, as it is not possible to link to everything relevant directly from the User Portal.

The ESO Science Archive, which was presented in detail by Martino Romaniello, is an important resource for astronomers. Martino explained the various flavours in which data can be downloaded, and also the archive services that allow users to easily find the science frames and the associated calibrations needed to reduce data. Around 2.6 million processed science files are present in the archive, ready to be analysed and published. However, Martino emphasised that the user may need to fully understand the dataset and triple-check the original files and data processing steps, especially in cases that involve unexpected findings. It is not always safe to blindly accept reduced data.

If the science data have not already been processed, one needs to use the data reduction process. Wolfram Freudling explained how this can be done, using ESO pipelines and also the ESO data organiser tools (EsoReflex and the command line ESO Recipe Execution tool EsoRex), which help to run the pipeline recipes in a structured way. Wolfram showed how EsoReflex organises the data, runs the recipes in order, displays final results and sometimes also intermediate products that facilitate the optimisation of parameters for a given reduction step. Once the optimal data reduction strategy is known, EsoRex offers another possibility to script and further automate data processing.

An important aspect of the workshop was to provide demonstrations and tutorials of the various tools and services available from ESO. Accordingly, Giacomo Beccari presented the new Phase 2 (p2) tool used to prepare observations in SM or VM. Jörg Retzlaff and Alberto Micol presented the archive services, illustrating the forthcoming new interface, and the

possibility of making queries in a programmatic way. Lodovico Coccato gave a demonstration of how to reduce data with EsoReflex, as well as how to use the software Molecfit to remove atmospheric signatures from science spectra. Finally, John Pritchard showed how to modify EsoReflex workflows to tailor them to the user's aims.

One full day of the workshop was dedicated to hands-on sessions. In the first part, on Wednesday morning, three parallel tutorial sessions were held, during which participants were guided in using EsoReflex for three instruments, MUSE, the Ultraviolet and Visual Echelle Spectrograph (UVES) and X-shooter. These instruments were chosen as the majority of the participants expressed an interest in them when registering for the workshop. In each case, after a first step-by-step demonstration, the participants could choose to reduce a set of data provided by the organisers or to work on their own data. Two or three tutors were available for each session, helping and advising the participants in this endeavour.

In the afternoon, participants were able to interact with ESO staff and discuss topics of their choice, including help with data reduction, help with proposal writing, finding information on ESO web pages, installing ESO software, help with observation preparations, and using the Science Archive either to access data or to return reduced data to the archive. At registration, participants were asked to indicate the area of the programme (proposal preparation, observing strategies and tools usage, data reduction) they would like to explore further. Participants were then split into small groups with overlapping interests, or had scheduled one-to-one sessions with the ESO staff member who was best placed to help with their specific topic.

At the end of the workshop, the organisers asked participants to provide feedback, and an extremely large number of people, more than 50% of the attendees, did so. The feedback was unanimously positive with all respondents saying they would recommend such a workshop to their colleagues. A few suggestions for similar future workshops were also received, with opinions differing, depending on the previous experience and knowledge of participants. It is our aim to repeat this workshop approximately every two years to promptly address questions from the continuous flow of new users of ESO facilities.

Acknowledgements

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Links

[1] All presentations as well as some of the video recordings are available on the workshop web page: https://www.eso.org/sci/meetings/2018/Users-Workshop/program.html

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Report on the

ESO–NEON Observing School at La Silla Observatory

held at ESO Vitacura, Santiago & La Silla Observatory in Chile, 18 February–2 March 2018

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During the two weeks between 19 February and 2 March 2018, the Office for Science at Vitacura and the La Silla Observatory were the hosts of the second ESO/NEON (Network of European Observatories in the North) La Silla Observing School. Thanks to the generous funding from ESO, the Optical Infrared Coordination Network for Astronomy (OPTICON), and the La Silla Observatory, a group of 20 students, consisting of mostly PhD but also some advanced MSc students, from different parts of the world, were guided by five ESO tutors. The students prepared and carried out complex observations, reduced and analysed the data, and finally presented the results to the ESO scientific community at Vitacura. In addition to learning about the observing techniques that were used during the school, the students also attended several lectures covering the current and future capabilities of the Atacama Large Millimeter/submillimeter Array (ALMA), the telescopes at Paranal, and the Extremely Large Telescope (ELT), as well as talks on what makes a good scientific presentation, time management, effective proposal writing, and career choices.

Over the course of three nights at La Silla, the students used the ESO Faint Object Spectrograph and Camera (EFOSC2) and